Claims

1. A method of performing model-based optical lithography corrections comprising:
providing a cell array layout of a desired design data hierarchy having a plurality of finite geometrical shapes;
partitioning said cell array layout into a plurality of cells;
generating an interaction map based on a density map corresponding to interactions between said plurality of finite geometrical shapes and said plurality of cells;
truncating said interaction map to generate a map of truncated cells;
grouping substantially identical occurrences of selected ones of said truncated cells into a single bucket selected from a plurality of distinct buckets; and
enforcing said desired design data hierarchy using said plurality of distinct buckets to correct for optical lithography.

2. The method of claim 1 wherein said desired design data hierarchy comprises a plurality of levels of hierarchy such that said method may occur at any of said plurality of levels of hierarchy.

3. The method of claim 1 wherein said cell array layout comprises a cause-image of said determined desired design data hierarchy for enforcing said desired design data hierarchy.

4. The method of claim 1 wherein said plurality of finite geometrical shapes comprises a plurality of polygons.

5. The method of claim 4 wherein said plurality of polygons are selected from the group of polygons consisting of a regular polygon, irregular polygon, convex polygon, concave polygon, regular convex polygon, regular concave polygon, irregular convex polygon, irregular concave polygon and combinations thereof.

6. The method of claim 1 wherein said plurality of cells of said partitioned cell array layout comprise a plurality of finite shapes capable of covering an entire area of said cell array layout.

7. The method of claim 1 wherein said step of generating said interaction map further comprises:

computing said density map comprising a plurality of densities, one for each of said plurality of cells, wherein said plurality of densities correspond to said interactions for each of said plurality of cells;

providing a plurality of convolved densities by convolving said plurality of densities with an inverse power law kernel;

generating said interaction map using said plurality of convolved densities.

8. The method of claim 1 wherein said interactions between said plurality of finite geometrical shapes and said plurality of cells are selected from a group of density effects consisting of geometries of the finite geometrical shapes, an amount of coverage of said finite geometrical shapes, an area coverage, a computed aerial image coverage, a computed resist image coverage, perimeter coverage and combinations thereof.

9. The method of claim 1 wherein said step of truncating said interaction map to generate said map of truncated cells further comprises assigning a reference designator selected from a group of reference designators to each of said truncated cells wherein identical reference designators denote substantially identical truncated cells.

10. The method of claim 1 wherein said step of grouping said substantially identical occurrences of selected ones of said truncated cells into said buckets further comprises:

determining a density value and all neighboring cells for each of said truncated cells residing within said map of truncated cells;

determining at least one set of substantially identical truncated cells within said map by locating selected ones of said truncated cells have substantially identical said density values and said neighboring cells; and

grouping said at least one set of substantially identical truncated cells into said bucket.

11. The method of claim 10 further comprising determining a plurality of differing sets of substantially identical truncated cells and grouping each of said plurality of differing sets into a respective differing bucket selected from said plurality of distinct buckets, wherein each said respective differing bucket comprises only substantially identical ones of said truncated cells.

12. The method of claim 1 wherein said step of grouping said substantially identical occurrences of said selected ones of said truncated cells transforms said selected ones of said truncated cells into a single building block for enforcing said design data hierarchy.

13. The method of claim 12 further including the steps of:

providing a plurality of differing single building blocks;

generating a hierarchal arrangement of said plurality of differing single building blocks; and

enforcing said desired design data hierarchy using said hierarchal arrangement.

14. The method of claim 1 wherein said desired design data hierarchy is enforced by maintaining said desired design data hierarchy.

15. The method of claim 1 wherein said desired design data hierarchy is enforced by building a new design data hierarchy upon at least partial destruction of said desired design data hierarchy.

16. A method of performing model-based optical lithography corrections comprising:

providing a cell array layout representative of a desired design data hierarchy having a plurality of polygons thereon;

partitioning said cell array layout into a plurality of cells;

providing a density map corresponding to interactions between said polygons and said plurality of cells;

generating an interaction map based on said density map;

truncating said interaction map to generate a map of truncated cells;

segregating substantially identical groupings of said truncated cells respectively into differing ones of a plurality of buckets, whereby each of said plurality of buckets comprises a single set of said identical groupings of said truncated cells,

generating a hierarchal arrangement using said plurality of buckets; and

enforcing said desired design data hierarchy using said hierarchal arrangement to correct for optical lithography.

17. The method of claim 16 wherein said density map comprises a plurality of densities, one for each of said plurality of cells.

18. The method of claim 17 further including the step of convolving said plurality of densities with an inverse power law kernel prior to generating said interaction map.

19. The method of claim 16 wherein said interactions between said polygons and said plurality of cells are selected from a group of density effects consisting of geometries of the polygons, an amount of coverage of said polygons, an area coverage, a computed aerial image coverage, a computed resist image coverage, perimeter coverage and combinations thereof.

20. The method of claim 16 wherein said step of truncating said interaction map to generate said map of truncated cells further comprises assigning a reference designator selected from a group of reference designators to each of said truncated cells wherein identical reference designators denote substantially identical truncated cells.

21. The method of claim 16 wherein said step of grouping said substantially identical occurrences of selected ones of said truncated cells into said buckets further comprises:

determining a density value and all neighboring cells for each of said truncated cells residing within said map of truncated cells;

determining at least one set of substantially identical truncated cells within said map by locating selected ones of said truncated cells have substantially identical said density values and said neighboring cells; and

grouping said at least one set of substantially identical truncated cells into said single bucket.

22. The method of claim 16 wherein said step of segregating said substantially identical groupings of said truncated cells transforms said groupings of said truncated cells into a single building block for enforcing said design data hierarchy.

23. The method of claim 22 wherein said hierarchal arrangement comprises a plurality of said single building blocks.

24. The method of claim 23 wherein said plurality of said single building blocks occur at numerous locations across said map of truncated cells selected from a group of building block occurrences consisting of exact duplicates, rotated versions, mirrored versions, rotated-mirrored versions and combinations thereof.

25. The method of claim 16 wherein said desired design data hierarchy is enforced by maintaining said desired design data hierarchy.

26. The method of claim 16 wherein said desired design data hierarchy is enforced by rebuilding a new design data hierarchy upon at least partial destruction of said desired design data hierarchy.

27. The method of claim 26 wherein said desired design data hierarchy and said new design data hierarchy are identical to each other.

28. The method of claim 26 wherein said desired design data hierarchy and said new design data hierarchy are different from each other.

29. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for performing model-based optical proximity correction, said method steps comprising:

providing a cell array layout of a desired design data hierarchy having a plurality of finite geometrical shapes;

partitioning said cell array layout into a plurality of cells;

generating an interaction map based on a density map corresponding to interactions between said plurality of finite geometrical shapes and said plurality of cells;

truncating said interaction map to generate a map of truncated cells;

grouping substantially identical occurrences of selected ones of said truncated cells into a single bucket selected from a plurality of distinct buckets; and

enforcing said desired design data hierarchy using said plurality of distinct buckets to correct for optical lithography.

30. A program storage device readable by a machine, tangibly embodying a program of instructions executable by the machine to perform method steps for performing model-based optical proximity correction, said method steps comprising:

providing a cell array layout representative of a desired design data hierarchy having a plurality of polygons thereon;

partitioning said cell array layout into a plurality of cells;

providing a density map corresponding to interactions between said polygons and said plurality of cells;

generating an interaction map based on said density map;

truncating said interaction map to generate a map of truncated cells;

segregating substantially identical groupings of said truncated cells respectively into differing ones of a plurality of buckets, whereby each of said plurality of buckets comprises a single set of said identical groupings of said truncated cells,

generating a hierarchal arrangement using said plurality of buckets; and

enforcing said desired design data hierarchy using said hierarchal arrangement to correct for optical lithography.